Johnstonia, a New Genus of Gouanieae (Rhamnaceae) from Peru

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ABSTRACT. A new genus, *Johnstonia* (Rhamnaceae, Gouanieae), is proposed for *Gouania axilliflora* M. C. Johnston, a species from Peru affined to *Alvimiantha* Grey-Wilson and *Reissekia* Endlicher, from which it differs by the sessile paired flowers in the axil of leaves; it is also distinct from *Alvimiantha* by the entire mericarps. The new combination *Johnstonia axilliflora* (M. C. Johnston) Tortosa is made.

RESUMEN. Se propone un nuevo género, *Johnstonia* (Rhamnaceae, Gouanieae), para *Gouania axilliflora* M. C. Johnston, una especie de Perú afín a *Alvimiantha* Grey-Wilson and *Reissekia* Endlicher, de los cuales se diferencia por las flores geminadas sésiles en la axila de las hojas; también se distingue de *Alvimiantha* por los mericarpios enteros. Se establece la nueva combinación *Johnstonia axilliflora* (M. C. Johnston) Tortosa.

Key words: Gouanieae, *Johnstonia*, Peru, Rhamnaceae.

The tribe Gouanieae Reissek of the family Rhamnaceae groups genera with inferior ovary, generally with winged fruits (Suessenguth, 1953). One of its genera, *Gouania* Jacquin, has a wide distribution area in America (from Florida (U.S.A.) and northern Mexico to Bolivia, Paraguay, and northeastern Argentina and Uruguay), Africa, Asia, Australia, and Oceania. Its species are climbers with short shoots ending in a tendril, spike-like inflorescences, flowers with a disk with conspicuous free lobules opposite to the sepals, and winged fruits that divide into three mericarps, each sustained by two carpophore bundles.

Gouania axilliflora M. C. Johnston, proposed by Johnston (1988) for a Peruvian plant, differs from *Gouania* in the absence of tendril-shoots, absence of floral disk lobules, and in the inflorescences formed by sessile flowers paired in the axil of leaves. In the first two characters it matches two other South American genera of Gouanieae, *Alvimiantha* Grey-Wilson and *Reissekia* Endlicher, both monotypic genera from the east of Brazil, with pedunculated umbellate-cymose inflorescences.

The unique characters of the Peruvian species, lead us to erect a new genus.

Johnstonia Tortosa, gen. nov. TYPE: *Johnstonia axilliflora* (M. C. Johnston) Tortosa.

Rhamnacearum, a genere *Gouaniam* lobulis disci carentibus, floribus geminis ad axillam foliorum, absentia ramulorum in capreolos terminantes differt; *Alvimianthae* et *Reissekiae* affinis, sed floribus geminatis sessilibus ab eis recedens, ab *Alvimiantha* differt mericarpiis integris.

Climbers with tendrils in the flowering branches. Leaves sparse, elliptic, entire, 3-nerved, petiolate. Flowers in axillary, sessile, 2-flowered inflorescences. Floral tube hemispherical; sepals 5, triangular, externally pubescent; petals 5, concave; stamens 5, with the anthers hooded by the petals; disk flat, unlobed; ovary inferior, trilocular, with solitary ovules in each loculus, style 3-branched, stigmas club-shaped. Fruit schizocarp, giving rise to three winged mericarps.

The genus is named in honor of Marshal C. Johnston, who has clarified the taxonomy of many genera of Rhamnaceae from America.

1. Johnstonia axilliflora (M. C. Johnston) Tortosa, comb. nov. Basionym: *Gouania axilliflora* M. C. Johnston, Syst. Bot. 13: 493. 1988. TYPE: Peru. Department of Cajamarca, Province of Cajabamba, Condebamba valley, Cajabamba–Cajamarca road, 15 Feb. 1983, *D. N. Smith & R. Vásquez M. 3396* (holotype, TEX; isotypes (not seen) AMAZ, CPUN, HUT, MO, USM).

When Johnston (1988) proposed *Gouania axilliflora* M. C. Johnston for a Peruvian plant, he stated that in habit, foliage, and structure of the flowers the new species is closely related to *Alvimiantha tricamerata* Grey-Wilson, characterized by its flowers arranged in a pedunculate 2- to 7-flowered congested cyme and by its winged seeds. He considered that the characters used for recognition of the genera in the tribe Gouanieae were so weak that he rejected the alternative of erecting a genus for the new species. Therefore, he discussed the possibility

of including *Alvimiantha* within *Gouania* near *G. axilliflora*, but considered that much field and laboratory study was necessary before such a decision.

Medan (1989) described the structure of the fruits of the genera *Alvimiantha* and *Gouania*, both with a 3-seeded schizocarp, with winged diaspores. He showed that in the genus *Gouania*, when fruits ripen, the three carpels separate along the planes of the septa, and each mericarp hangs down from the detached marginal bundles. Further, the wings of the diaspores (mericarps) represent pericarp outgrowths of the commissural areas of adjacent carpels. In *Alvimiantha*, the fruits also undergo carpellary separation along the planes of the septa with the detachment of marginal bundles, but a tangential splitting of the pericarp wall occurs, giving rise to an outer coriaceous valve and a winged diaspore (with a wingless seed included), confounded by Grey-Wilson with a winged seed (Grey-Wilson, 1978: 290, figs. H, J, K). The fruits of *Johnstonia axilliflora* conform with those of *Gouania* (Fig. 1D).

Johnstonia and *Gouania* differ in their habit. *Gouania* bears serial buds in the leaf axils of orthotropic shoots (erect axis, with radial symmetry, negatively geotropic) (Cremer, 1974; Tourn et al., 1991); the distal bud of the axillary complex gives rise to a tendril shoot (Fig. 1A, B, ts). These tendril shoots have determinate growth and generally bear 2 prophylls (Fig. 1B, p) and a foliage leaf, in the axil of which develop a tendril (Fig. 1B, t) and a spike-like inflorescence (Fig. 1B, r) (Tourn et al., 1991). Tendrils may also occur in the axis of the inflorescences (Fig. 1B, t_1; see also illustration of *G. latifolia* Reissek, in Reissek, 1861, tab. 36). In *Johnstonia axilliflora*, tendrils (Fig. 1C, t) occur only at the nodes of plagiotropic shoots (axis ± horizontal, with dorsiventral symmetry) (Fig. 1C, ps; see also Johnston, 1988: 494, fig. 1, a); serial buds and tendril-shoots are lacking. *Alvimiantha* and *Reissekia* correspond in this aspect of habit to *Johnstonia* (Fig. 1E; see also Grey-Wilson, 1978: 290, fig. 1, and Reissek, 1861, tab. 40, respectively).

Inflorescences in *Gouania* are spike-like racemes (Fig. 1B, r, r_1), in *Johnstonia* 2-flowered glomerules (Fig. 1C, g), and in *Alvimiantha* and *Reissekia* pedunculated umbellate-cymes (Fig. 1E, u). In *Gouania* the disc of the flower is conspicuous with 5 elevated acuminate, obtuse, truncate or emarginate lobules, opposite to the sepals, while in *Alvimiantha*, *Johnstonia*, and *Reissekia* the floral disk is thin, flat, and unlobed.

All vegetative and reproductive characters place *Johnstonia axilliflora* near *Alvimiantha*, but the distinct trait of the fruit in the latter supports the decision to treat this species as belonging to a new genus.

Key to Genera of Gouanieae in America

1a. Climbers with tendrils.
  2a. Floral disc with conspicuous lobes opposite the sepals; tendril-shoots present; inflorescence a spike-like raceme . . . . . *Gouania*
  2b. Floral disc without lobes; tendril-shoots absent.
    3a. Leaves entire, 3-nerved.
      4a. Mericarps undivided; inflorescence a 2-flowered glomerule . . . *Johnstonia*
      4b. Mericarps splitting in an outer coriaceous valve and a winged diaspore; inflorescence a pedunculated umbellate-cyme . . . . . *Alvimiantha*
    3b. Leaves finely serrate, pinnately nerved (obscurely 3-nerved); inflorescence a pedunculated umbellate-cyme . . *Reissekia*
1b. Perennial, erect or annual, decumbent herbs . . . . . *Crumenaria* Martius

Representative specimens examined. ***Alvimiantha.*** *A. tricamerata* Grey-Wilson: BRAZIL. 28 km NW of Lagoinha (which is 5.5 km SW of Delfino) on side road to Minas do Mimoso, Caatinga, *R. M. Harley 16890* (photos of isotypes MO, NY). ***Gouania.*** *G. adenophora* Pilger: BOLIVIA. **Pando:** Madre de Dios, Prov. Barranco de Puerto Candelaria, 140 m s.m., 19–VIII–1985, *Moraes 228* (LPB, NY). *G. aptera* DC.: PERU. **Amazonas:** Luya, Camporredondo, 18–VI–1999, *Campos 6037* (BAA). *G. latifolia* Reissek: BOLIVIA. **Santa Cruz:** Prov. Florida, 5 km (by road), 3 km (by air) NE of Bermejo, along petroleum pipeline and old horse road to Santa Cruz, 17–VII–1987, *Nee & Coimbra S. 35252* (LPB, MO, NY). *G. longipetala* Hemsley: CAMEROON. Bipinde, X–1913, *G. Gaubay 402* (SI). *G. longispicata* Engler: RHODESIA. Nyassa, Hochland, Station Kymbila, 1911, *A. Stolz 901* (SI). *G. lupuloides* (L.) Urban.: U.S.A. **Florida:** Indian River Region, 27–X–1902, *C. Brevard* (SI); ARGENTINA. **Misiones:** Iguazú, Cataratas del Iguazú, Balcón Salto Brasileños, 30–VII–1979, *Tortosa et al. 124* (BAA). *G. microcarpa* DC.: PHILIPPINES. **Luzon:** Prov. Rizal, XII–1909, *M. Ramos 96* (SI). *G. polygama* (Jacquin) Urban: BOLIVIA. Prov. Nor Yungas, 16.5 km NE of Chuspipata,13.6 km SW of Yolosa, 3–IV–1984, *Solomon & Uehling 12148* (MO). *G. trichodonta* Reissek: BOLIVIA. **Pando**: Prov. F. Román, Río Negro por el Río Negro, 120 m s.m., 17–VI–1987, *Solomon 17089* (MO). *G. ulmifolia* Hooker: PARAGUAY. **Alto Paraná**: Escuela Técnica Forestal, Pto. Pte. Stroessner, km 12, 01–1982, *Fernández Casas 5656* (G, MO); BRAZIL. **Parana:** Ponta Grossa, 13–II–1911, *P. Dressen* (SI).

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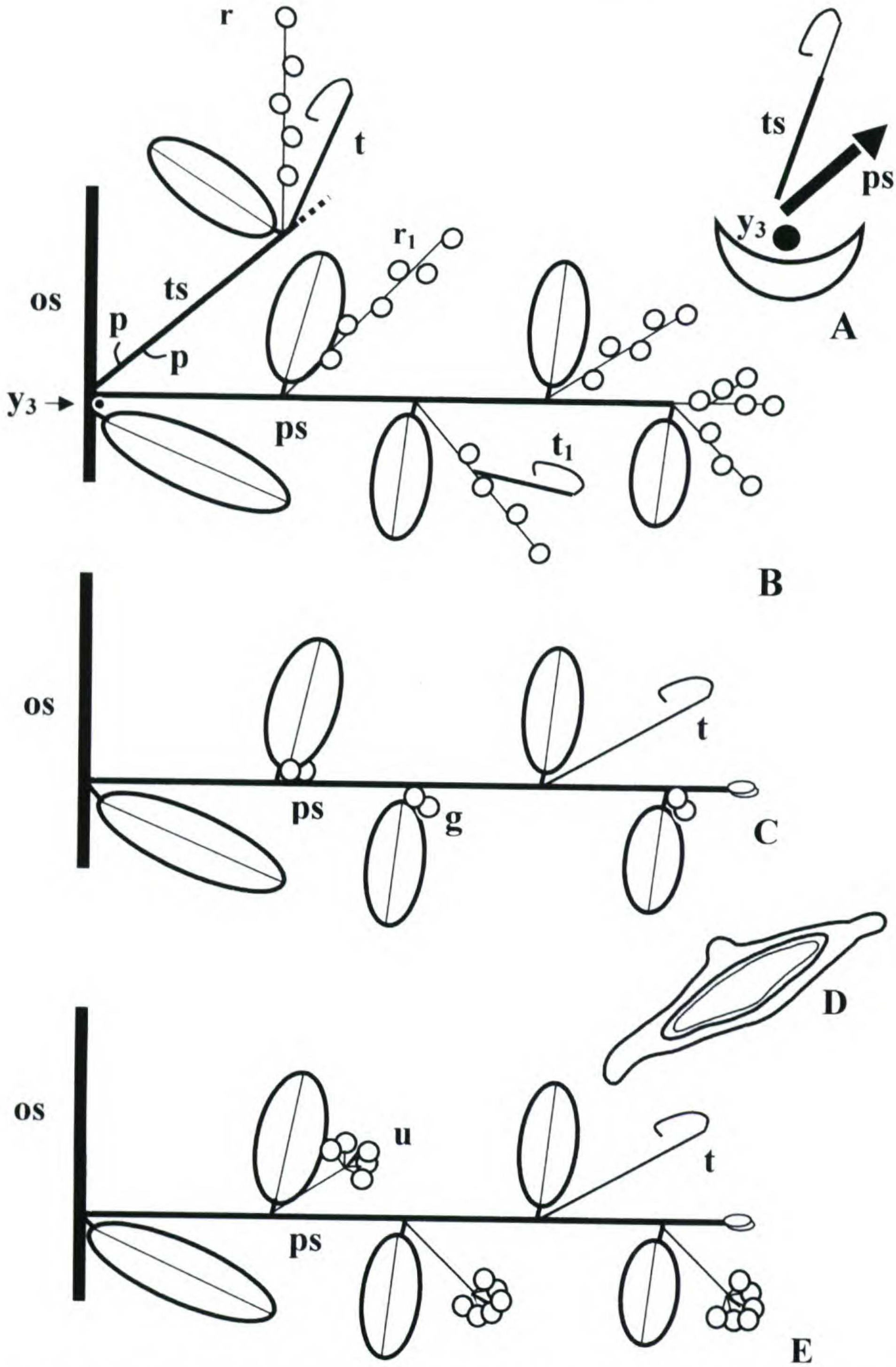

Figure 1. A, B, *Gouania.*—A. Axillary complex. —B. Vegetative and reproductive structures at a node. C, D, *Johnstonia axilliflora.*—C. Vegetative and reproductive structures at a node. —D. Cross section of a mericarp (from *Smith & Vásquez 3396,* holotype, TEX). —E. *Alvimiantha tricamerata.* Vegetative and reproductive structures at a node. References: **g,** 2-flowered glomerule; **os,** orthotropic shoot; **p,** prophyll; **ps,** plagiotropic shoot; **r** and $\mathbf{r_1}$, spike-like raceme; **t** and $\mathbf{t_1}$, tendril; **ts,** tendril shoot; **u,** umbellate-pedunculate inflorescence; $\mathbf{y_3}$, dormant proximal bud.

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